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AIR FORCE RESERVE OFFICER TRAINING CORPS SELECTION SYSTEM VALIDATION

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AIR FORCE SYSTEMS COMMAND
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13. ABSTRACT *(Maximum 200 words)*

This effort was conducted to validate the Air Force Reserve Officer Training Corps (AFROTC) selection system, using selection, training, and post-commission performance criteria. The purpose, method, and validity of the current AFROTC selection system were examined and discussed. The current AFROTC selection system assigns a Quality Index Score (QIS) to each candidate. This QIS score is the basis of selection decisions, and is generated from a weighted average of six variables: Scholastic Aptitude Test (SAT) scores, cumulative grade point average, three composite scores from the Air Force Officer Qualifying Test (AFOQT), and an overall rating assigned by the Detachment Commander. These QIS scores were found to be significantly related to measures of performance in training and, to a lesser extent, supervisory ratings of job performance, motivation, and potential for career progression. In addition, it was demonstrated that the predictive validity of QIS scores as presently calculated is essentially equivalent to that of QIS scores calculated from a previously used formula. Also, operational weights in the QIS formula were compared to optimal weights provided by regression analysis. It was found that predictive validity was somewhat increased when the weight for Detachment Commander Ratings was increased.

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SUMMARY

The United States Air Force has three primary methods for recruiting and selecting Air Force officers: (a) the Air Force Academy (USAFA) selects high school graduates for a 4-year college program, (b) the Air Force Reserve Officer Training Corps (AFROTC) selects college students for a 2-year Professional Officer Course (POC) located at participating institutions, and (c) the Air Force Officer Training School (OTS) selects college graduates for a 12-week training program. The present effort examined the selection process used for AFROTC candidates, in order to validate the variables currently used for selection against POC, technical training, and job performance criteria. In addition, the predictive validity of the current AFROTC selection method was compared to previous and proposed AFROTC selection methods. The USAFA and OTS selection methods are not examined in this report; however, they are described in other reports (Cowan, Barrett, & Wegner, in review; Scott, 1984; Stokes, 1984).

The current AFROTC selection system assigns a Quality Index Score (QIS) to each candidate, based on scores from six factors: Scholastic Aptitude Test (SAT) scores, cumulative grade point average, Detachment Commander Ratings, and scores from three composites of the Air Force Officer Qualifying Test (AFOQT). These QIS scores were examined for their relation to selection decisions and several training and job performance measures. The predictive validity of QIS scores as presently calculated was compared to that of QIS scores calculated from a previously used 10-Factor formula and a proposed 3-Factor formula. In addition, the weights assigned to each variable in the calculation of QIS scores were compared to the optimal weights assigned to each variable in stepwise regression analysis.

Findings were as follows:

1. The current method of selection into AFROTC programs was demonstrated to be significantly predictive of training and, to a lesser extent, supervisory ratings of job performance, motivation, and potential for career progression.

2. The predictive validity of the current method of AFROTC selection, using six predictor variables for determination of QIS scores, is equivalent to the predictive validity of the 10-Factor formula which was used before (1978--1982).

3. The proposed 3-Factor method of AFROTC selection was found to be equivalent to the current selection method for the prediction of training and on-the-job performance. The 3-Factor method of QIS calculation may be utilized without a significant loss in predictive validity.

4. QIS scores derived from regression weights were significantly higher in predictive validity than were QIS scores calculated from specified weights.

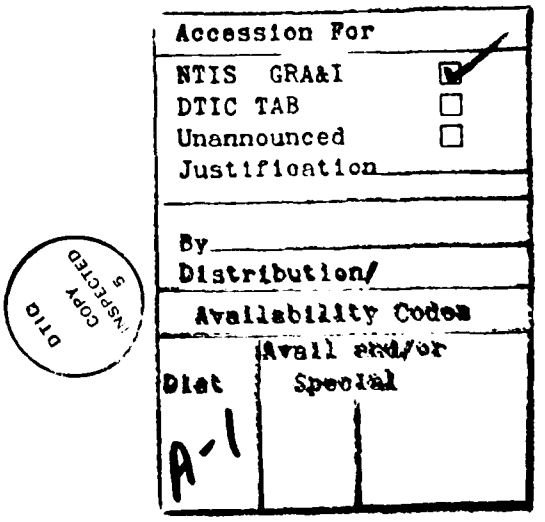
5. Regression weights were somewhat different than QIS weights, particularly for Detachment Commander Ratings; i.e., weights identified by regression analysis resulted in much higher weights being assigned to Detachment Commander Ratings. The higher weights, if applied operationally, would result in the Detachment Commander Ratings having an impact on the overall QIS nearly equal to that of academic predictors such as AFOQT Academic Aptitude scores and cumulative grade point average.

6. Detachment Commander Ratings were not significantly correlated to final technical training grades; however, they were significantly related to success in AFROTC training and to supervisory ratings of job performance, motivation, and potential for career progression.

7. There is a major problem in establishing predictive validity using on-the-job performance criteria. Officer Effectiveness Reports, had a mean score of 1.07 and a standard deviation of 0.30. Therefore almost all individuals received a very high rating of job performance. Although it is tempting to interpret this phenomenon as further validation of the present selection system, the phenomenon is more likely attributable to lack of discrimination in the ratings.

PREFACE

This work was completed under Task 771918, Selection and Classification Technologies, which is part of a larger effort in Force Aquisition and Distribution. It was subsumed under work unit number 77191847, Development and Validation of Civilian and Nonrated Officer Selection Methodologies. This work was begun in response to Request for Personnel Research (RPR) 80-06, Validation of Officer Training School and Air Force Reserve Officer Training Corps Selection Systems.



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I. INTRODUCTION

The United States Air Force (USAF) has three primary methods for recruiting and selecting Air Force officers: (a) The Air Force Academy (USAFA) selects high school graduates for a 4-year college program, (b) the Air Force Reserve Officer Training Corps (AFROTC) selects college students for a 2-year Professional Officer Course (POC) located at participating institutions, and (c) the Air Force Officer Training School (OTS) selects college graduates for a 12-week training program. This report examines the AFROTC selection process in order to describe, compare, and validate the variables used for selection. In addition, the predictive validity of the current method is compared to the predictive validity of previous and proposed AFROTC selection methods. The selection methods used by USAFA and OTS are not examined in this report; however, they are described in other reports (Cowan, Barrett, & Wegner, in review; Scott, 1984b; Stokes, 1984).

The AFROTC Selection System

AFROTC Headquarters is responsible for the selection and training of AFROTC candidates. AFROTC detachment offices, located at participating colleges and universities, administer a 2-year POC designed to prepare selected candidates for military officer duty. Entrance into the POC requires a military service commitment and usually occurs at the end of the sophomore year. POC students are selected using the Weighted Professional Officer Course Selection System (WPSS). POC candidates are considered on the basis of six measures of academic and/or personal characteristics. These six variables are differentially weighted, then combined into an overall measure of applicant quality, or Quality Index Score (Jackson & Gordon, 1977). The factors considered for the generation of the Quality Index Score (QIS) include:

1. *Air Force Officer Qualifying Test (AFOQT): Verbal Composite.* The AFOQT consists of 16 subtests which are used to generate one or more of five composite scores used to help predict success in certain types of Air Force training programs. The Verbal composite measures various types of verbal knowledge and abilities. This composite includes subtests that measure the ability to recognize relationships among words, the ability to read and understand paragraphs on diverse topics, and the ability to understand synonyms.

2. *AFOQT: Quantitative Composite.* The Quantitative composite measures various types of quantitative knowledge and abilities. The composite includes subtests that measure the ability to understand arithmetic relationships, to interpret data from graphs and charts, to use mathematical terms and formulae, and to recognize mathematical relationships.

3. *AFOQT: Academic Aptitude Composite.* The Academic Aptitude composite measures verbal and quantitative knowledge and abilities by combining all subtests used to score the Verbal and Quantitative composites. All AFOQT composite scores are reported in percentile.

4. *Scholastic Aptitude Test (SAT) Score.* The College Entrance Examination Board's SAT test measures verbal and mathematical abilities. The sum of the verbal and quantitative SAT scores are considered in the AFROTC selection process. The AFROTC WPSS application process provides for a method of converting other college entrance scores (e.g., AFOQT, American College Testing (ACT), Florida 12th Grade Test) to an equivalent SAT score.

5. *Cumulative Grade Point Average (GPA).* This average is calculated based on all college courses the candidate has taken, using a 0- to 4-point scale. A GPA of 4 points is equivalent to an A average; 3 points, to B; etc.

6. *Detachment Commander's Rating (DCR).* This is an overall rating of the acceptability of an applicant, based on application information (including AFOQT, SAT, and GPA data) and a personal interview with the Detachment Commander. The Commander may also consult with ROTC instructors who have had previous contact with the candidate. Usually with other ROTC officers present, the Commander uses a semistructured interview technique to ascertain the candidate's aptitude, motivation, attitudes, background, and general suitability for a military officer career. The candidate is given a rating from 0 (not acceptable) to 8 (outstanding).

Minimum Qualifications. There are minimum qualification levels for some of the QIS factors. The candidate must score at 15 on the AFOQT Verbal composite and 10 on the AFOQT Quantitative composite. He or she must also receive an acceptable rating from the Detachment Commander. The Detachment Commander cannot assign an 8 (outstanding) rating to more than 10% of the POC applicants. The Commander cannot assign a 7 rating to more than 15% of the candidates, nor a 6 rating to more than 25% The remaining 50% may receive a rating of 5; therefore a rating of 4 will usually result in nonacceptance.

In addition, candidates whose stated preference is to be a pilot or navigator must make a minimum percentile score on the Pilot and Navigator composites of the AFOQT. Pilot candidates must make a minimum of 25 on the Pilot composite and a minimum of 10 on the Navigator composite, with a minimum combined score of 50 for both composites. Navigator candidates must make a minimum of 25 on the Navigator composite and a minimum of 10 on the Pilot composite, with a minimum combined score of 50 for both composites.

Candidates who apply for certain technical fields, such as engineering, cartography, or computer science, must also have a specialized technical degree.

Selection Using the 6-Factor QIS Score. The six measures are weighted and combined into an overall Quality Index Score (QIS), based on weights developed through policy-capturing techniques (Jackson & Gordon, 1977). Appendix A contains a sample form used by AFROTC detachment offices for determining an applicant's QIS score. Based on their previously indicated preference(s) for the Pilot, Navigator and/or non-rated options, AFROTC applicants are considered for each preferred option along with the other applicants for that option. The QIS is used by the Detachment Commanders and by a central selection board to select the most highly qualified applicants for openings in those areas. Situational factors such as detachment enrollment allocations and USAF production goals may also affect selection decisions.

Alternate AFROTC Selection Procedures

This report examines two alternatives for determining QIS scores. One method, which was used for AFROTC selection during 1978--1982, uses 10 variables for the calculation of QIS. This 10-Factor QIS uses five of the six variables which are currently used, plus five additional measures. The other procedure is a 3-Factor QIS, which has been proposed to replace the current 6-Factor method. The variables for these methods are described below.

10-Factor QIS. The 10-Factor QIS determination used 10 variables, which were weighted and combined into an overall score. The 10 factors included five of the current factors, plus five additional factors:

1. AFOQT: Academic Aptitude Composite.

2. AFOQT: Quantitative Composite.

3. Scholastic Aptitude Test (SAT) Score.

4. Cumulative Grade Point Average (GPA).

5. Detachment Commander's Rating (DCR).

6. AFROTC Grade Point Average (AFROTC GPA). The AFROTC GPA is calculated from any ROTC courses the applicant has already taken. Applicants with prior military experience are credited with a 3.0 GPA for this factor. GPA is described on a 4-point scale.

7. Cadet Rank. Applicants are ranked by the Detachment Commander on a scale of 1 (highest - most desirable) to 50 (last choice). If there are fewer than 50 applicants, some ranks are not assigned; if more than 50, some applicants are assigned duplicate ranks. Rankings correspond with the Detachment Commander ratings; i.e., if the Commander rates an applicant very highly (7 or 8), the applicant should according to policy guidelines appear at or near the top of the ranked list.

8. Total Cadets Ranked. This factor describes the actual number of applicants ranked. Thus, an applicant who ranks 30 out of a total of 100 applicants is differentiated from an applicant who ranks 30 out of a total of 30 applicants.

9. General Military Course (GMC) Credit. This is a dichotomous variable indicating that the applicant was enrolled in a 4-year AFROTC program or has otherwise gained credit for military subjects (such as prior military service).

10. Technical Credit. This is a dichotomous variable indicating that the applicant was enrolled in an academic specialty that is considered technical (primarily areas of engineering) or has completed calculus requirements for a technical degree.

3-Factor QIS. The second alternative is a selection method composed of three of the six factors that are currently used to determine an applicant's QIS. The three factors are:

1. AFOQT: Academic Aptitude Composite.

2. Cumulative Overall GPA.

3. Detachment Commander Rating.

These three factors have been proposed by the Air Force Recruiting Service (AFRS) to replace the six factors that are currently used for the determination of QIS scores.

Comparison of the 3-, 6-, and 10-Factor QIS scores. The currently used 6-Factor QIS score was compared with the previously used 10-Factor QIS score and the proposed 3-Factor QIS score in terms of the predictive validity of each. QIS scores were calculated by all three methods for AFROTC applicants who sought admission during fiscal years 1978 through 1981. It was expected that the 6-Factor QIS scores would predict selection and performance criteria to the same extent as the 10-Factor QIS scores, based on previous analyses that identified the 6-Factor QIS as equivalent to the 10-Factor method (Jackson & Gordon, 1977). In addition, the 3-Factor QIS scores were expected to predict selection and performance criteria to the

same extent as the 6-Factor QIS scores, due to interrelationships between SAT scores and AFOQT Verbal, Quantitative, and Academic Aptitude composite scores.

II. METHOD

General Description. The 11 variables which have been used to calculate QIS scores were examined for their individual correlations to OTS selection, and subsequent training and job performance criteria. QIS scores were generated for each subject according to the 10-Factor, 6-Factor, and 3-Factor formulae. Correlations between these three types of QIS scores and selection, training, and job performance criteria were examined in order to determine if the 6-Factor and 3-Factor QIS formulae are as predictive of later performance criteria for those applicants as was the previously used 10-Factor QIS formula.

In addition, individual variables were examined using regression analysis, which resulted in optimal weights for the prediction of each criterion. The regression models consisted of sets of predictor variables corresponding to the three QIS formulae. The predictive validity of the QIS scores was compared to the predictive validity of scores generated by corresponding regression models. Operational weights for each QIS formula were then compared to corresponding regression weights to determine whether the current weights should be adjusted in order to enhance the prediction of performance criteria.

Subjects and Criteria. Data on applicants seeking admission into the AFROTC during fiscal years 1978 through 1981 were obtained from Headquarters AFROTC (N = 13,722). Samples were generated from the total data base as determined by the availability of nine criterion variables:

1. POC Selection. This variable indicates whether or not the applicant was selected for AFROTC POC (Total N = 13,722; Total Selected = 9,450).

2. POC Student Performance Rating. This is an overall rating assigned by POC instructors, ranging from 1 to 5 (Total N = 5,249).

3. POC Completion. This variable indicates whether or not POC attendees graduated from the program (Total N = 9,450; Total Completed = 7,679).

4. POC Distinguished Graduate. This variable indicates whether or not POC graduates were selected as distinguished graduates (Total N = 7,679; Total Distinguished Graduates = 1,625).

5. Technical Training Course Final Grade. This grade represents the overall test performance of subjects graduating from a technical training school. Final grades ranged from 62 to 99 (Total N = 1,645).

6. Experimental Job Performance Evaluation. An experimental performance appraisal form was developed specifically for use in this study (see Appendix A for sample form). The form was administered for research purposes only; ratings were not put into the ratees' official personnel files. The overall scores ranged from 1.00 to 9.00 (Total N = 1,082).

7. Experimental Potential for Progression Evaluation. This is the supervising officer's appraisal of the individual's potential for progression and is included in the experimental job performance form. The rating results in an overall score of 1.00 to 9.00 (Total N = 1,080).

8. Experimental Motivation-to-Perform Evaluation. This is the supervising officer's appraisal of the individual's motivation to perform and is included in the experimental job performance form. The appraisal provides overall ratings of 1.00 to 9.00 (Total N = 1,080).

9. Officer Effectiveness Reports (OERs). This is the official USAF officer performance appraisal form (AF Form 707). Appraisals result in overall ratings ranging from 1 (very good) to 6 (poor). A sample OER form is contained in Appendix A (Total N = 3,923).

Predictor Variables. The variables used to compute QIS scores are shown in Table 1, together with their operational weights. During 1978 - 1982, 10 variables were used; the current QIS computation uses six; and a proposed QIS computation uses only three variables. The operational weights listed in the table are the actual weights that are applied to the variable measures, and thus reflect the metric of each measure. These weights cannot be interpreted in terms of the comparative importance of each variable, without first controlling for the differences in variable metrics.

Table 1. **Weights Used in Computation of QIS[a]**

			Variable weight		
	Variables	Range	1978 - 1982 QIS	Current QIS	Proposed QIS
1.	AFOQT-Academic Aptitude	(1 - 95)	.1687	.1293	2.0000
2.	AFOQT-Quantitative	(1 - 95)	.0556	.1125	-
3.	AFOQT-Verbal	(1 - 95)	-	.1189	-
4.	SAT[b]	(470 - 1560)	.0225	.0187	-
5.	Cumulative GPA	(0.5 - 4.0)	.0931	.0719	.6000
6.	AFROTC GPA	(1.0 - 4.0)	.0157	-	-
7.	Det. Commander Rating	(0 - 8)	1.9625	3.8233	2.0000
8.	Cadet Rank	(1 - 50)	-.1106	-	-
9.	Total Cadets Ranked	(1 - 131)	.0362	-	-
10.	Gen. Military Crse Credit	(0 - 1)	1.5125	-	-
11.	Technical Credit	(0 - 1)	2.1332	-	-

Note. The reader is reminded that these weights reflect the metric of the variables; the variance of each variable should be considered before attempting to interpret the relative magnitude of each weight.

[a]The QIS is computed for selection into the Professional Officer Course by multiplying the indicated weight by the sc re an applicant receives on the particular variable, and then summing the products.

[b]The SAT score used is the sum of the verbal and quantitative composites of the Scholastic Aptitude Test, or equivalent scores.

Analyses. The three types of QIS scores were calculated for each AFROTC applicant (N = 13,722), using the operational weights listed in Table 1. Descriptive statistics for the individual predictor variables, the three types of QIS scores, and the nine performance criteria were computed along with the correlations between the predictors and the criteria. Analyses addressed two main issues: (a) Are there significant differences among the three methods of calculating QIS scores in terms of their correlations with training and job performance criteria; i.e., is the proposed 3-Factor method of calculating QIS as predictive of the criteria as are the other methods? (b) Are the operational weights optimal for the prediction of training and job performance criteria, or will different weights result in significantly higher correlations with the criteria? Analyses involved three phases:

1. Comparison of the Predictive Validity of Past, Present, and Proposed QIS Formulae. The three methods of determining QIS scores were compared by (a) generating QIS scores for each AFROTC applicant for each method, (b) computing the correlations between each QIS score and the training and job performance criteria, and (c) testing for significant differences

between QIS scores and the various criteria. It was expected that the proposed method of using three variables to compute QIS scores would be as predictive of criteria as were the other two methods.

2. Comparison of the Predictive Validity of Past, Present, and Proposed QIS Formulae to That of Corresponding Regression Models. The variables which comprise the three types of QIS scores were then examined using regression analyses in order to determine if different variable weights would result in significantly higher correlations with the performance criteria. Four sets of variables were examined: (a) the set of all 11 predictor variables (full model), (b) the set of 10 variables used in the past (restricted model 1), (c) the set of six variables which are currently used (restricted model 2), and (d) the set of three variables proposed as a new method of determining QIS scores (restricted model 3). Each set of variables was entered in regression analysis for each criterion. This resulted in a separate set of optimal weights for the prediction of each criterion, with a separate multiple correlation for each criterion. The correlations between QIS scores and each criterion were compared to the multiple correlations obtained from each corresponding regression model. Differences between the correlations were tested for significance.

3. Comparison of Formulae Weights to Optimal Weights Identified in Regression Analyses. Regression analyses provided a unique set of predictor weights for each criterion. A single set of weights was needed in order to compare the regression weights to the formulae weights. This was done by averaging the weights for each predictor variable across the multiple criteria, with each criterion having equal weight in the average. The resulting set of representative regression weights for each model was compared to the specified weights for the corresponding QIS formula.

III. RESULTS

Descriptive statistics. Table 2 shows the mean, standard deviation, and range of values for each of the 11 AFROTC predictor variables. Also listed are the means, standard deviations, and ranges for the three QIS scores which were calculated using the operational formulae. Most of the predictor variables showed a moderate amount of variance. The variable showing the least variance was General Military Course Credit; 91% of AFROTC applicants had been assigned credit for previous military courses.

Means, standard deviations, and ranges of values for the nine criterion variables are shown in Table 3. There is very little variance in the OER ratings (mean = 1.07, SD = 0.30, range = 1-6); thus, the correlations between predictor variables and OER ratings cannot be expected to be very high. A 5-point scale was used for Detachment Commander Ratings prior to 1983; therefore, all applicants in this study have this 5-point rating. The current and the proposed QIS formulas use a 9-point scale for Detachment Commander Ratings; therefore, the 5-point ratings were transformed to a 9-point scale in the calculation of the current and proposed QIS formula scores.

Relations Between Individual Predictor Variables and Criteria. Correlations between the 11 individual predictor variables and the nine criteria are shown in Table 4. Correlations were not corrected for reliability and the restriction in range of the predictor variables; therefore, the reported correlations are conservative estimates. Also, since the variance of the job performance criteria was very restricted, the low correlations are not surprising.

Table 2. **Means, Standard Deviations, and Ranges of AFROTC Quality Index Score Predictor Variables (N = 13,722 AFROTC Applicants)**

	Variable Title	Mean	SD	Range Minimum	Range Maximum
1.	AFOQT Academic Aptitude	52.80	26.15	1.00	95.00
2.	AFOQT Quantitative	54.43	25.98	1.00	95.00
3.	AFOQT Verbal	50.48	26.32	1.00	95.00
4.	Scholastic Aptitude Test	1062.59	169.30	470.00	1560.00
5.	Cumulative Grade Point Average	2.70	0.56	0.50	4.00
6.	AFROTC Grade Point Average	3.32	0.55	1.00	4.00
7.	Detachment Commander's Rating[a]	2.94	0.89	0.00	4.00
8.	Cadet Rank	20.75	13.81	1.00	50.00
9.	Total Cadets Ranked	48.26	12.74	1.00	131.00
10.	General Military Course Credit	0.91	0.28	0.00	1.00
11.	Technical Credit	0.49	0.50	0.00	1.00
12.	10-Factor QIS score	73.86	13.83	19.87	112.46
13.	6-Factor QIS score	80.72	16.08	18.68	122.60
14.	3-Factor QIS score	279.56	69.83	57.40	446.00

[a]A 5-point (0-4) Detachment Commander's Rating was used in the computation of the Quality Index Score until the 1983 AFROTC applicant group; therefore, all applicants in this study have this 5-point scale rating. A 9-point (0-8) Detachment Commander's Rating is used in the current Quality Index Score and the same 9-point scale is being considered for use in the Proposed Quality Index Score. Ratings were transformed to a 9-point scale for the calculation of the 6-Factor and 3-Factor QIS scores.

Table 3. **Means, Standard Deviations, Ranges, and Ns for the Criterion Variables**

	Criterion Title	Mean	SD	Range Minimum	Range Maximum	N
1.	POC Selection	0.69	0.46	0.00	1.00	13,722
2.	POC Student Performance	3.69	0.86	1.00	5.00	5,249
3.	POC Completion	0.81	0.39	0.00	1.00	9,450
4.	POC Distinguished Graduate	0.21	0.41	0.00	1.00	7,679
5.	Tech. School Final Grade	86.83	6.82	62.00	99.00	1,645
6.	Exp. Performance Eval	7.09	1.42	1.00	9.00	1,082
7.	Exp. Potential Eval	7.13	1.67	1.00	9.00	1,080
8.	Exp. Motivation Eval	7.29	1.55	1.00	9.00	1,080
9.	OER performance rating[a]	1.07	0.30	1.00	6.00	3,923

[a]The Officer Effectiveness Report (OER) uses a reverse rating scale with 1 as the highest rating and 6 as the lowest rating.

The AFROTC Grade Point Average was the only predictor found to be significantly related to all nine criteria, but was not the best predictor for any criterion. Those predictors shown to be most highly related to the criteria varied both within the three categories of criteria (POC, technical school, and job performance), and from one category to another, as follows:

1. Correlations Between Individual Predictors and POC Criteria. POC criteria included (a) POC selection, (b) POC completion, (c) POC distinguished graduates, and (d) POC performance ratings. Although the Detachment Commander Rating was the single best predictor of selection (r = .23), cumulative GPA was the single best predictor of POC completion (r = .17), POC senior student performance (r = .24), and POC distinguished graduate (r = .31). Other predictors significantly related to POC criteria included Detachment Commander ratings cadet rank, AFROTC GPA, SAT scores, and all AFOQT scores.

Table 4. **Zero-Order Correlations Between AFROTC Applicant QIS Variables and Criteria**

	Quality Index Score (QIS) Variables											
Criteria	**AFOQT Acad Apt**	**AFOQT Quant**	**AFOQT Verb**	**SAT**	**Cum GPA**	**Det CO Rating**	**AFROTC GPA**	**GMC credit**	**Tech credit**	**Cadets ranked**	**Cadet rank**	**N**
POC Selection	.10**	.10**	.08**	.11**	.13**	.23**	.15**	.09**	.03	.04	-.19**	13,722
POC Performance	.12**	.08**	.13**	.12**	.24**	.19**	.18**	.05	.04	-.01	-.19**	5,249
POC Completion	.06*	.07*	.04	.07*	.17**	.11**	.10**	.03	.01	.01	-.11**	9,450
POC Dist. Grad.	.15**	.12**	.13**	.16**	.31**	.21**	.19**	.04	.06*	.01	-.22**	7,679
Tech. School Grade	.37**	.33**	.33**	.39**	.20**	-.00	.09**	.12**	.16**	.02	-.02	1,645
Exp. Performance	.07*	.05	.03	.06*	.07*	.10**	.06*	.06*	.08**	.07*	-.03	1,082
Exp. Potential	.14**	.12**	.06*	.13**	.06*	.11**	.10**	.06*	.11**	.10**	-.02	1,080
Exp. Motivation	.05	.03	.01	.04	.04	.11**	.07*	.05	.06*	.10**	-.02	1,080
OERs	.09**	-.11**	-.04	-.09**	-.05	-.06*	-.06*	-.06*	-.12**	-.05	.01	3,923

Note. Greatest correlation in each row underlined.

*significant at .05 level.

**significant at .01 level.

2. Correlations Between Individual Predictors and Technical Training Course Final Grades. The single best predictor of technical school grades was the SAT score (r = .39), followed closely by AFOQT composite scores (r = .33 to .37). Cumulative GPA, AFROTC GPA, GMC Credit and Technical Credit were significantly related but to a lesser degree (r = .09 to .20). Although the Detachment Commander Rating was the single best predictor of POC selection and was significantly related to other POC criteria, it was not found to be related to technical school grades (r = .00).

3. Correlations Between Individual Predictors and Supervisory Ratings of Performance, Potential, and Motivation on the Job. Correlations between individual predictors and on-the-job performance appraisal criteria were lower than correlations found for training criteria (r = .01 to .14). The highest relation was between the AFOQT Academic Aptitude score and the Experimental Potential for Progression Evaluation (r = .14). Detachment Commander Ratings, Technical Credit, and AFROTC GPA were significantly related to all four performance criteria.

Comparison of the Predictive Validity of Each Type of QIS Score

Table 5 displays the zero-order correlation coefficients between the three types of QIS scores and the nine criteria. All correlations were significant at the .05 level of probability. Correlations were highest for the Technical School Grade (r = .38 to .41) and were lowest for the three job performance criteria (r = .06 to .16). Correlations were negative for the OER criterion because the OER uses a reverse rating scale, from 1 (highest rating) to 6 (lowest rating).

Table 5. **Zero-Order Correlations for Three Types of QIS Scores and Nine POC, Training, and Performance Criteria**

Criteria	Quality Index Scores			N
	10-Factor	6-Factor	3-Factor	
1. POC Selection	.1882	.2072	.1528	13,722
2. POC Performance	.2339	.2363	.2209	5,249
3. POC Completion	.1486	.1413	.1353	9,450
4. POC Dist. Grad.	.2937	.2843	.2750	7,679
5. Tech. School Grade	.4113	.3795	.3975	1,645
6. EXP. Performance	.1058	.1038	.0961	1,082
7. EXP. Potential	.1585	.1554	.1429	1,080
8. EXP. Motivation	.0767	.0785	.0632	1,080
9. OERs	-.1151	-.1089	-.0997	3,923

Note. All correlations are significant at .05 level.

Difference tests were conducted between the correlation coefficients of the three types of QIS scores, using Hotelling's formula (Guilford & Fruchter, 1978, p. 164). Table 6 lists the differences in r between the three types of QIS scores for the nine criteria, and the level of significance for each comparison. The greatest empirical difference was between the 3-Factor and 6-Factor QIS scores for POC selection (.0544). This was expected, since the 6-Factor method was actually used for selection. The reason the correlation between the 6-Factor QIS score and POC selection is not perfect is that different detachment commands have different selection ratios (depending on the number of applicants); thus, an applicant with a particular QIS score may be selected at one command but not at another.

Table 6. **Differences Between 3-, 6-, and 10-Factor QIS Scores in Their Correlations to POC, Training, and Performance Criteria**

Criterion	Difference between r values of QIS scores					
	10 vs 6	p[a]	6 vs 3	p[a]	10 vs 3	p[a]
1. POC SEL	.0190	.001	.0544	.001	.0354	.001
2. POC PER	.0024	ns	.0154	.010	.0130	.001
3. POC COM	.0073	.010	.0060	ns	.0133	.001
4. POC DG	.0094	.001	.0093	.020	.0187	.001
5. TS GRADE	.0318	.001	.0180	ns	.0138	ns
6. EXP PER	.0020	ns	.0077	ns	.0097	ns
7. EXT POT	.0031	ns	.0125	ns	.0156	ns
8. EXP MOT	.0018	ns	.0153	ns	.0135	ns
9. OER	.0062	ns	.0092	ns	.0154	.001

[a]level of significance of difference between correlations to each criterion, using Hotelling's formula for correlated correlations (in Guilford & Fruchter, 1978, p. 164).

Though a few of the differences between the QIS methods were statistically significant, the differences were not large. The largest difference for predicting post-selection criteria was between the 10-Factor and 6-Factor QIS in predicting technical school grades (.0318). Otherwise, there was very little difference among the three methods in terms of their ability to predict post-selection criteria; all other differences in correlations were less than .02.

Predictive Validity of Regression Models

Table 7 describes the variables included in each regression model, and Table 8 compares the multiple correlation values obtained for each of the regression models for the prediction of the nine criteria. Regression weights for each model, applied to each criterion, are listed in Appendix B for the full model (11 variables), Appendix C for model 1 (10 variables), Appendix D for model 2 (6 variables), and Appendix E for model 3 (3 variables). F-tests were conducted to determine if differences between the regression models were statistically significant. Appendix F shows the results for all model comparisons for each criterion.

Table 7. **Variables used in Full and Restricted Regression Models to Predict Criteria[a]**

	Full model variables (11 variables)	Restricted model 1 (10 variables)	Restricted model 2 (6 variables)	Restricted model 3 (3 variables)
1.	AFOQT-Academic Aptitude	X	X	X
2.	AFOQT-Quantitative	X	X	
3.	AFOQT-Verbal		X	
4.	AFROTC Grade Point Average	X		
5.	Cumulative Grade Point Average	X	X	X
6.	Scholastic Aptitude Test	X	X	
7.	Detachment Commander Rating	X	X	X
8.	Cadet Rank	X		
9.	Total Cadets Ranked	X		
10.	General Military Course Credit	X		
11.	Technical Credit	X		

[a]The three restricted models were analyzed and compared for prediction of nine criteria.

Table 8. **Summary of Multiple R and R^2 of Full and Restricted Regression Models for the Prediction of POC, Training, and Job Performance Criteria**

	CRITERIA								
	POCsel	**POCper**	**POCcom**	**POCdq**	**TECHgr**	**EXPper**	**EXPpot**	**EXPmot**	**OERs**
Full Model (11 variables)									
Multiple R	.2732	.3033	.2006	.3631	.4462	.1656	.2208	.1775	.1610
R^2	.0747	.0920	.0402	.1318	.1991	.0274	.0487	.0315	.0259
Restricted Model 1 (10 variables)									
Multiple R	.2728	.3023	.1993	.3631	.4422	.1603	.2080	.1698	.1590
R^2	.0744	.0914	.0397	.1318	.1956	.0257	.0433	.0288	.0253
Model 1 vs Full Model[a]	ns	ns	.05	ns	.01	ns	.05	ns	ns
Restricted Model 2 (6 variables)									
Multiple R	.2491	.2910	.1865	.3488	.4341	.1321	.1856	.1275	.1249
R^2	.0620	.0847	.0348	.1217	.1884	.0174	.0344	.0163	.0156
Model 2 vs Model 1	.01	.01	.01	.01	.01	ns	.05	.01	.01
Restricted Model 3 (3 variables)									
Multiple R	.2486	.2841	.1843	.3482	.4016	.1235	.1697	.1138	.1095
R^2	.0618	.0807	.0340	.1212	.1612	.0153	.0288	.0129	.0120
Model 3 vs Model 2	ns	.01	ns	ns	.01	ns	ns	ns	.01

[a] p of F-tests of model comparisons of predictive ability. See Appendix F for comparisons of all models for each criterion.

There were significant differences between model 1 (10 variables) and model 2 (6 variables) for all criteria except the experimental ratings of Job Performance. Otherwise differences in the multiple correlations obtained for models 1 and 2 ranged from .01 to .04. Thus, although there was some loss in prediction from the deletion of four variables from the predictor set, the differences in the prediction correlations were relatively small. Further, there was very little differences in the predictive validity of model 2 (6 variables) compared to model 3 (3 variables). Differences between model 2 and model 3 were nonsignificant for all criteria but three: POC performance ratings, technical school grade, and OER ratings. The differences in multiple correlation values between model 2 and model 3 for these three criteria were also relatively small.

Results indicate that the deletion of three variables from the current method of QIS determination would not practically impair the predictive validity of the QIS scores. This is as expected, in that the three variables suggested for deletion--the SAT, AFOQT-Verbal, and AFOQT-Quantitative--are highly correlated with one of the remaining variables, the AFOQT Academic Aptitude score ($\underline{r}$ = .85, .83, and .82, respectively), as shown in Appendix G.

Predictive Validity of QIS Weights Versus Their Corresponding Regression Weights

In order to compare the predictive validity of each, the multiple correlations obtained from regression analyses of model 1, model 2, and model 3 were compared to the correlations obtained for the 3-, 6-, and 10-Factor QIS scores for each criterion, using F-tests of statistical significance. Table 9 summarizes the correlations for each method and the level of significance of each comparison. Correlations were significantly higher for the regression models as compared to the corresponding QIS methods for all comparisons but one (exception = 6-Factor QIS versus model 2 for the prediction of experimental measures of job performance). Differences in correlations ranged from .004 (criterion = technical school grades) to .10 (criterion = selection); both of these differences were found for the three-variable methods.

Differences in the predictive ability of the QIS scores and the regression models should be interpreted with some caution, however, since statistical analysis procedures capitalize on chance. The multiple correlations obtained in these analyses might shrink if the regression weights were applied to a second group of subjects. In that case, the regression models might not be significantly more predictive than actual QIS scores for those criteria for which the present analyses showed a relatively small difference in prediction between QIS scores and their corresponding regression models (e.g., OER ratings and technical school grades). Regression weights would be expected to remain significantly more predictive of criteria that showed a larger difference in prediction between QIS scores and corresponding regression models, such as performance in POC training, POC completion, POC distinguished graduates, and experimental measures of motivation and potential for career progression.

The raw score weights and R^2 values for model 1 (10 factors), model 2 (6 factors), and model 3 (3 factors) are listed in Appendices C, D, and E, for each criterion. A summary of the information for each model that facilitates comparison of weights for each criterion is provided in Appendix H, Tables H-1 (model 1), H-2, (model 2), and H-3 (model 3).

The raw score regression weights assigned to a particular predictor variable changed in value depending on the criterion being predicted. This was not surprising due to the fact that each predictor variable was more highly correlated to some criteria than to others (see Table 4). Changes in the regression weight of an individual variable for different criteria correspond in general to the correlation of that variable with each criterion. For example, measures of academic ability (SAT, GPA, AFOQT scores) were more highly correlated to success in technical

Table 9. **Comparison of Correlations of QIS Scores Versus Their Corresponding Regression Models**

Criterion	Predictors: 10-Factor QIS/Mod 1	Diff	p[a]	6-Factor QIS/Mod 2	Diff	p	3-Factor QIS/Mod 3	Diff	p
1. POC Selection N = 13,722	.19/.27	.08	.01	.21/.26	.05	.01	.15/.25	.10	.01
2. POC perf. rating N = 5,249	.23/.30	.07	.01	.24/.29	.05	.01	.22/.28	.06	.01
3. POC Completion N = 9,450	.15/.20	.05	.01	.14/.19	.05	.01	.14/.18	.o4	.01
4. POC Dist. grad. N = 7,679	.29/.36	.07	.01	.28/.35	.07	.01	.28/.35	.07	.01
5. Tech school grade N = 1,645	.41/.44	.03	.01	.38/.43	.05	.01	.40/.40	.00	.05
6. Exp. Performance N = 1,082	.11/.16	.05	.01	.10/.13	.03	.25	.10/.12	.02	.01
7. Exp. Potential N = 1,082	.16/.21	.05	.05	.16/.18	.02	.05	.14/.17	.03	.01
8. Exp. Motivation N = 1,082	.08/.17	.09	.01	.08/.13	.05	.05	.06/.11	.05	.01
9. OER N = 3,923	-.12/-.16	.04	.01	-.11/-.12	.01	.05	-.10/-.11	.01	.01

Note. All correlations are significant at $p = .05$.

[a] p is the significance level of F-tests comparing the predictive validity of QIS scores to the predictive validity of the corresponding regression models.

training school than to the other criteria; these measures also have larger assigned weights in the regression analysis for the technical training criterion. In contrast, overall ratings assigned by Detachment Commanders were not significantly correlated to success in technical training, but they were significantly correlated to POC and job performance criteria. Therefore, it is not surprising that raw score weights for Detachment Commander Ratings were negative for the prediction of technical training grades but were given much greater weight for the prediction of POC and job performance criteria.

The correspondence of regression weights to individual correlations between each predictor variable and each criterion is modified somewhat when one examines the individual academic predictors, because these academic predictors are highly intercorrelated (see Appendix G for intercorrelations between predictor variables). Thus, though all academic predictors may be significantly correlated to a particular criterion such as technical school grades, the regression analysis may select one academic predictor as the more accurate predictor and assign it a relatively large weight, while assigning relatively little weight to the other academic predictors.

Relative Magnitude of QIS Weights Versus Regression Weights. In order to compare the QIS weights to the regression weights, single regression weights were computed for each variable by averaging across the eight POC, training and job performance criteria. The regression weights for OER ratings were primarily negative, due to the reverse scale for the OER. Since this negative relation is due to the scale, and indicates a positive correlation with performance, the negative weights for the OER criterion were treated as positive in the averaging process. Otherwise, the negative weight for OER ratings would result in a smaller average weight when, in fact, it should be higher so as to accurately represent the predictive validity of that variable. Table 10 lists the averaged regression weights for each of the three models. Appendix F lists each of the criteria and the R^2 differences, degrees of freedom, F-values, and significance levels for each test of difference between the models.

Table 10. **Average Raw Score Regression Weights for Model 1, Model 2, and Model 3[a]**

Variable	Averaged raw score regression weight		
	Model 1	Model 2	Model 3
AFOQT-Academic Aptitude	.0054	.0016	.0144
AFOQT-Quantitative	.0017	.0048	-
AFOQT-Verbal	-	.0026	-
AFROTC Grade Point Average	.0007	-	-
Cumulative Grade Point Average	.0035	.0036	.0036
Scholastic Aptitude Test	.0013	.0014	-
Detachment Commander Rating	.0919	.1029	.0995
Cadet Rank	-.0004	-	-
Total Cadets Ranked	.0025	-	-
General Military Course Credit	.3393	-	-
Technical Credit	.2042	-	-

[a]In the computation of the average weights, all eight (selection not included in averaging) criteria were assumed to be of equal importance.

Table 11 compares the relative magnitude of the QIS weights to the averaged regression weights. In order to facilitate this comparison, the weight for the Academic Aptitude composite of the AFOQT was set to 1.00 across the six methods and the equivalent weights for the other factors were computed within each set.

Table 11. **Relative Magnitude of QIS Weights Versus Raw Score Regression Weights**

	Weights[a]					
	1978-82		Current		Proposed	
Variables	10 QIS	Mod 1	6 QIS	Mod 2	3 QIS	Mod 3
AFOQT-Academic Aptitude	1.00	1.00	1.00	1.00	1.00	1.00
Detach. Commander Rating	11.63	17.02	29.57	64.31	1.00	6.91
Cumulative GPA	.55	.65	.56	2.25	.30	.25
AFOQT-Quantitative	.33	.31	.87	3.00	-	-
Scholastic Aptitude Test	.13	.24	.14	.88	-	-
AFOQT-Verbal	-	-	.92	1.63	-	-
AFROTC GPA	.09	.13	-	-	-	-
Cadet Rank	-.66	-.07	-	-	-	-
Total Cadets Ranked	.21	.46	-	-	-	-
Gen. Mil. Course Credit	8.97	62.83	-	-	-	-
Technical Credit	12.64	37.81	-	-	-	-

[a]The weight for AFOQT-Academic Aptitude was set at 1.00 across all models, so that the raw score regression weight of each variable could be directly compared to its corresponding QIS weight.

Compared to the 10-Factor QIS model 1 increases the weight ratio markedly for the Detachment Commander's Rating, the General Military Course Credit, and Technical Credit, while reducing the weight ratio for Cadet Rank to almost zero. Comparing the current 6-Factor QIS to model 2 reveals that the regression weight for Detachment Commander's Rating is more than double that of the operational QIS weight. Regression weights assigned to AFOQT-Quantitative score and to Cumulative GPA for model 2 are also higher than the operational QIS weights. Compared to the 3-Factor QIS, model 3 assigned a lower weight for the Cumulative GPA and a higher weight to the Detachment Commander's Rating.

The averaged raw regression weights resulted in higher weights for Detachment Commander Ratings in all models, when compared to the QIS weights. In the 6-Factor model, the weight for Detachment Commander Ratings was more than doubled, and in the 3-Factor model, the weight was increased more than sixfold. This rating was weighted least for the 3-Factor QIS. It should be noted that these raw regression weights do not represent the actual ratio of differences in importance of the predictor variables, because they do not control for differences among the variables in terms of their metric (i.e. range, variability, etc.).

Standard Score Regression Weights. Standard score weights control for the differences in predictor metrics, and it is therefore necessary to examine them to determine the actual effect of each predictor weight on the resultant overall score. Table 12 provides the averaged standard score regression weights for models 1, 2, and 3. Appendix H (Tables H-4 through H-6) provides a listing of each standard weight generated for models 1, 2, and 3, for each of the nine POC, training and job performance criteria. Table 13 provides the averaged standard score regression weights for each model, after rescaling, with the weight for Academic Aptitude scores set equal to 1.00.

Whereas the raw score regression weights for Detachment Commander Ratings were quite high, the standardized regression weights demonstrate that the relative impact of the Detachment Commander Rating on the overall score is not that high; generally the standard weight for Detachment Commander Rating is essentially equivalent to the weight assigned to the Academic Aptitude score. For example, in model 3, (with 3 predictors), the raw score regression weights shown in Table 11 for Cumulative GPA, Academic Aptitude, and Detachment Commander's Rating were 0.25, 1.00, and 6.91, respectively. From this, it would seem that the Detachment

Commander's Rating would have far greater importance than the GPA in the determination of score in model 3. Actually, however, after controlling for differences in the metric of each variable (Table 13), the resulting standard weights are 0.96, 1.00, and 0.80, respectively. Thus, though the raw score regression weights of 0.25, 1.00, and 6.91 in Table H would appear to assign nearly equal contributions to Academic Aptitude score and cumulative GPA for the prediction of performance, and a much greater contribution to Detachment Commander Ratings; however, examination of the standard score shows the raw scores to be misleading. It can be inferred, therefore, that using the proposed raw score weights (3-Factor QIS) for the three predictors (0.3, 1.0, & 1.0 for GPA, Academic Aptitude scores, and Detachment Commander Ratings, respectively) will result in the Detachment Commander's Ratings having a smaller impact on the overall score than will the other two factors.

Table 12. **Average Standard Score Regression Weights for Model 1, Model 2, and Model 3[a]**

Variable	Averaged standard regression weight		
	Model 1	Model 2	Model 3
AFOQT-Academic Aptitude	.0669	.0790	.1061
AFOQT-Quantitative	-.0053	.0021	-
AFOQT-Verbal	-	-.0190	-
AFROTC Grade Point Average	.0400	-	-
Cumulative Grade Point Average	.0960	.1020	.1020
Scholastic Aptitude Test	.0262	.0453	-
Detachment Commander Rating	.0699	.0845	.0848
Cadet Rank	-.0067	-	-
Total Cadets Ranked	.0412	-	-
General Military Course Credit	.0385	-	-
Technical Credit	.0175	-	-

[a]In the computation of the average weights, all nine criteria were assumed to be of equal importance.

Table 13. **Rescaled Average Standard Score Regression Weights for Model 1, Model 2, and Model 3[a]**

Variable	Averaged standard score regression weight		
	Model 1	Model 2	Model 3
AFOQT-Academic Aptitude	1.00	1.00	1.00
AFOQT-Quantitative	0.08	0.03	-
AFOQT-Verbal	-	-0.24	-
AFROTC Grade Point Average	0.60	-	-
Cumulative Grade Point Average	1.44	1.29	0.96
Scholastic Aptitude Test	0.39	0.57	-
Detachment Commander Rating	1.05	1.07	0.80
Cadet Rank	-0.10	-	-
Total Cadets Ranked	0.62	-	-
General Military Course Credit	0.58	-	-
Technical Credit	0.26	-	-

[a]In the computation of the average weights, all nine criteria were assumed to be of equal importance.

IV. DISCUSSION

Validation of the Current 6-Factor AFROTC Selection System. As shown in Table 9, the current AFROTC selection system (6-Factor QIS) was demonstrated to have a significant degree of predictive validity for a variety of POC, technical training, and job performance criteria. The 6-Factor QIS scores now used for entry into the AFROTC POC were significantly related to all measures of POC, technical training, and job performance. The predictive validity of this method was highest for technical school final grade (.38) and lowest for supervisory ratings of job performance (.10), potential for career progression (.16), and motivation (.08).

The current 6-Factor QIS score predicted the POC, technical training, and job performance criteria almost as well as did the previously used 10-Factor QIS scores. The greatest difference in prediction was for technical school final course grade, which was better predicted by the former 10-Factor QIS scores. However; the correlation coefficients differed by only .03 point (10-Factor $\underline{r}$, .41; 6-Factor $\underline{r}$, 38). Thus, the difference in predictive validity between the current method and the previous 10-Factor method is minimal.

Validation of the 3-Factor QIS. The proposed 3-Factor QIS scores predicted almost as well as the currently used 6-Factor QIS score, with somewhat lower prediction for POC selection and performance ratings and two of the job performance criteria. However, the 3-Factor QIS scores predicted technical school final grades to a slightly higher degree ($\underline{r}$ = .40 versus $\underline{r}$ = .38). Results suggest that the 3-factor method of determining QIS scores could replace the 6-Factor method without a significant loss in predictive validity. It should be noted, however, that the QIS scores derived from the proposed weights did not correlate with the criteria as highly as did QIS scores generated from regression weights.

Comparison of the Predictive Validity of Actual QIS Weights as Compared to Optimal Regression Weights. As shown in Table 9, scores generated by regression weights were more highly related to POC, technical training, and job performance criteria than were their corresponding QIS scores. Differences in predictive validity between the QIS scores and their corresponding regression models were greatest for POC selection and other POC criteria and lowest for technical school grade and job performance measures. As mentioned earlier, the predictive validity of the regression weights might shrink somewhat when applied to another group of subjects. However, since differences between the QIS scores and their corresponding regression weights were substantial for the POC criteria, it is likely that the regression weights would remain relatively stable when applied to another group of subjects.

Comparison of Relative Magnitude of Actual QIS Weights and Regression Weights. In order to compare regression weights to actual QIS weights, the regression weights were averaged across the POC, technical training, and job performance criteria. As shown in Table 11, the averaged raw regression weights resulted in higher weights for Detachment Commander Ratings in all models, when compared to the QIS weights. In the 6-factor model, the weight for Detachment Commander Ratings was more than doubled; in the 3-factor model, the weight was increased almost sevenfold.

It must be emphasized, however, that these raw regression weights do not represent actual differences in the importance of the predictor variables, because they do not control for differences among the variables in terms of their metrics. For example, although the raw score regression weights appear to give a much higher weight to Detachment Commander Ratings compared to the proposed weights for the 3-factor model, the standard score regression weight for Detachment Commander Ratings is actually smaller in relation to the weights for the two other predictors. Thus, it can be inferred that the proposed weights (shown in Table 1) for the three-variable QIS score would result in essentially an equal impact on total score from AFOQT

Academic Aptitude and SAT scores and relatively little contribution from Detachment Commander Ratings.

The present investigation has also demonstrated some of the difficulties associated with validating selection methods against job performance measures. The low variability of OER indicates the need for additional job performance criteria. Other measures or indicators should be used as additional performance criteria. In the present effort, the experimental performance appraisal criteria provided a greater amount of information regarding the variation in Air Force officer performance than did the OER ratings; however, this information was collected as a special effort. Subsequent research regarding validation of Air Force officer selection should identify alternative performance criteria, particularly those which might be readily available in existing records. These could include factors previously identified as relevant for promotion decisions (Scott, 1984a), such as type of assignment, degree of responsibility, and number of decorations. Other possibilities for criteria include rate of promotion and other military awards, achievements, and/or letters of appreciation.

Issues Not Addressd in This Report. The scope of the present report was restricted to the validation of variables which have been or are being used for AFROTC selection. These variables may or may not be the optimal predictors of POC, technical training, and/or job performance criteria. Further research would be necessary to determine the relation of other applicant characteristics to these criteria, such as previous work experience, prior military service, awards and/or achievements, and participation in extracurricular activities such as team sports. These characteristics are probably considered to some extent by the Detachment Commander in assigning overall ratings. Since these ratings were positively related to performance criteria, there is reason to expect that some of the additional characteristics that Commanders consider in assigning their ratings would be predictive of Air Force officer performance. A list of potential predictors could be obtained by eliciting information from Detachment Commanders as to the factors they consider most relevant in their rating decisions. Identification of applicant characteristics which are predictive of Air Force officer performance would also provide further information to the Detachment Commanders and serve to enhance the reliability and predictive validity of Detachment Commander Ratings. At this time, the reliability of the Detachment Commander Ratings is not known.

Another issue not addressed in this report is the possibility that different QIS predictor variables could be more or less predictive of Air Force officer success for different occupational specialties. For example, AFOQT Quantitative composite scores may be more predictive of Air Force officer success in technical fields, as opposed to administrative fields. In addition, other applicant characteristics may also be predictive of particular fields. For example, having a Private Pilot License may be significantly related to Air Force officer success as a pilot. Investigation into the issues of alternative predictors and differential prediction for occupational categories will provide information that will contribute to optimum selection and classification of AFROTC candidates.

V. CONCLUSIONS

The principal conclusions reached as a result of these analyses are as follows:

1. The current method of selection into AFROTC programs was demonstrated to be significantly predictive of POC and technical training and, to a lesser extent, supervisory ratings of job performance, motivation, and potential for career progression.

2. The predictive validity of the current method of AFROTC selection was found to be equivalent to the previous 10-factor method of AFROTC selection for the prediction of POC, technical training, and job performance criteria.

3. The proposed 3-factor method of AFROTC selection was found to be equivalent to the current selection method for the prediction of POC, technical training, and on-the-job performance. The 3-factor method of QIS calculation may be used without a significant loss in predictive validity.

4. Quality Index Scores derived from regression weights were significantly higher in predictive validity than their corresponding QIS scores.

5. Regression weights were somewhat different than QIS weights, particularly for Detachment Commander Ratings. Weights identified by regression analysis resulted in much higher weights being assigned to Detachment Commander Ratings. The higher weights, if applied operationally, would result in the Detachment Commander Ratings having an impact on the overall Quality Index Score nearly equal to that of academic predictors such as Academic Aptitude scores and cumulative GPA.

6. Detachment Commander Ratings were not significantly correlated to success in technical training school; however, they were significantly related to success in AFROTC training and to supervisory ratings of job performance, motivation, and potential for career progression.

7. There is a major problem in establishing predictive validity using on-the-job performance criteria. The OER, for which the scores range from 1 (very good) to 6, had a mean score of 1.07 and a standard deviation of 0.30. In other words, almost all individuals received a very high rating of job performance. Though it is tempting to interpret this phenomenon as further validation of the present selection system, the phenomenon is more likely attributable to lack of discrimination in the ratings.

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APPENDIX A: SAMPLE APPRAISAL FORMS

1. AFROTC QIS Worksheets (10-Factor and 6-Factor)
2. Experimental Appraisal Form
3. OER Form

WPSS WORKSHEET

LAST NAME	SSAN	DATE OF BIRTH (YR MO DY)	SEX (MALE / FEMALE)

AFOQT (PILOT / NAVIGATOR)	ACADEMIC SPECIALTY CODE	ACADEMIC SPECIALTY	CALCULUS COMPLETED (1 2 3 4)

PRIVATE PILOT LICENSE	DET ALLOCATION	CATEGORY PREFERENCE (1ST 2D 3D)
☐ YES ☐ NO		

A. Det Commander Rating	☐☐	X 3.8233	=
B. Cumulative GPA	☐☐☐	X .0719	=
C. SAT or Equivalent	☐☐☐☐	X .0187	=
D. AFOQT Academic Apt	☐☐	X .1293	=
E. AFOQT Quantitative	☐☐	X .1125	=
F. AFOQT Verbal	☐☐	X .1189	=
G. TOTAL QUALITY INDEX SCORE			=

WPSS/CSP PROFILE SHEET

NOTE: For alphabetic O's use O, for numeric zeros use 0. Directive: AFROTCR 45-13

PART I

1. SOCIAL SECURITY NUMBER (1-11)	2. LAST NAME ONLY (12-23)	3. PROGRAM (24) WPSS: N, CSP: A

4. DATE OF BIRTH (25-30) YR MO DAY	5. SEX (32) MALE: M, FEMALE: F	6. RACE (33) CAU: C, NEGROID: N, OTHER: X	7. RSNG AS YEAR (34)	8. PRIOR SERVICE (35) NONE: A, 30-10: B, OTHER: C

9. PROJECTED DOC (36-39) YR MO	10. DET (41-43)	O/L (44)	11. SCHOOL WHICH NOW ENROLLED	12. APPLICANT FOR CSP (47) YES: Y, NO: N

13. SCHOLARSHIP STATUS (48) 0 2 3 4	14. FY YR (49)	15. ACADEMIC SPECIALTY CODE (50-53)	16. ACADEMIC SPECIALTY	17. CALCULUS COMPLETED FOR TECH ELIGIBILITY (90) N/A: N, NONE: 0, SOME: 1, ALL: 2

18. TECH ELIGIBLE (60) YES: 1, NO: 2	19. DET ENROLLMENT ALLOC (62)	20. CATEGORY PREF (64-66) 1st 2nd 3rd	21. AFOQT (70-78) Pilot Nav Verbal	22. POST MARK (77-80) FOR HQ USE ONLY

PART II

23. RECRUITER ID (13-17)	24. FICE CODE (18-23)	25. PIPS CODE (24-28)	26. SAT VERB (29-31)

27. SAT MATH (32-34)	28. ACT (35-36)	29. PLA SCORE (37-39)	30. PAA CONV (40-42)	31. WASH CONV. (44-47)

32.

A - AFOQT Officer Quality (48-49)		X 0.1687	
B - AFOQT Quantitative (50-51)		X 0.0556	
C - SAT or Equiv (53-56)		X 0.0225	
D - Cumulative GPA (57-59)		X 0.0931	
E - Dpt Commander's Rating (61)		X 1.9625	
F - AFROTC GPA (63-65)		X 0.0157	
G - GMC Credit (66)		X 1.5125	
H - Tech Credit (67)		X 2.1332	
I - Total Ranked (69-71)		X 0.0362	
J - Cadet Rank (Neg Weight) (72-74)		X - 0.1186	-
K - Quality Index Score (76-80)			

PROCESSING DET	POC ENTRY DATE	DATE SIGNED	SIGNATURE OF PAS

PART III

FOR HEADQUARTERS USE ONLY

1ST BOARD DECISION (19-20)	CAT SEL (79)

PERFORMANCE EVALUATION FOR RESEARCH AND DEVELOPMENT

NAME OF OFFICER TO BE EVALUATED	FOR RESEARCH PURPOSES ONLY. RATINGS WILL NOT BE ENTERED INTO THE OFFICER'S PERSONNEL RECORD NOR WILL THE RATINGS BE RELEASED TO ANYONE OUTSIDE THE AIR FORCE HUMAN RESOURCES LABORATORY.

PERFORMANCE EVALUATION RATING SCALE

1 Performance is completely inferior to most other officers of the same grade
2 Performance is far below average
3 Performance is below average
4 Performance is only slightly below average
5 Performance is comparable to most other officers of the same grade (average)
6 Performance is only slightly above average
7 Performance is above average
8 Performance is far above average
9 Performance is completely superior to most other officers of the same grade

PERFORMANCE CHARACTERISTICS	RATING
1. Assumes active leadership	
2. Decisions are sound and well thought out	
3. Works well under pressure	
4. Presents written facts in a clear and concise manner	
5. Is willing to accept responsibility	
6. Adapts quickly to new situations	
7. Accepts challenges willingly	
8. Demonstrates common sense	
9. Has skill in motivating others	
10. Functions effectively with only limited supervision	
11. Foresees future difficulties and plans accordingly	
12. Makes effective use of resources	
13. Has the ability to communicate ideas verbally	
14. Gives clear instructions to subordinates	
15. Consistently gets good results	
16. Is willing to do extra work when the need arises	
17. Maintains effective working relationships	
18. Sets realistic work objectives	
19. Lets subordinates know how they are doing	
20. Demonstrates real management abilitites	
21. Is fair in disciplinary decisions	
22. Can be relied upon to find a solution to a new problem	
23. Accepts responsibility for subordinate's actions	
24. Gets results through careful delegation of responsibilities	
CONTINUE RATINGS ON REVERSE	

For the following two statements, check the response that best indicates your judgement of this officer's motivation to perform as an Air Force officer and his or her potential to progress to higher levels of leadership, management, or technical skills.

25. Motivation to perform

[ ] 1 Has the lowest motivation of any officer of comparable grade
[ ] 2 Very nearly the lowest motivation
[ ] 3 Considerably less motivation
[ ] 4 Slightly less motivation
[ ] 5 No higher or lower motivation than other officers of comparable grade
[ ] 6 Slightly more motivation
[ ] 7 Considerably more motivation
[ ] 8 Very nearly the highest motivation
[ ] 9 Has the highest motivation of any officer of comparable grade

26. Potential for progression

[ ] 1 Has the lowest potential of any officer of comparable grade
[ ] 2 Very nearly the lowest potential
[ ] 3 Considerably less potential
[ ] 4 Slightly less potential
[ ] 5 No higher or lower potential than other officers of comparable grade
[ ] 6 Slightly more potential
[ ] 7 Considerably more potential
[ ] 8 Very nearly the highest potential
[ ] 9 Has the highest potential of any officer of comparable grade

RATING OFFICIAL'S SIGNATURE, GRADE, AND DATE

COMMENTS:

THIS EVALUATION IS FOR RESEARCH PURPOSES ONLY

AMD FORM 6, AUG 84

I. RATEE IDENTIFICATION DATA *(Read AFR 36-10 carefully before filling in any item)*			
1. NAME *(Last, First, Middle Initial)*	2. SSN	3. GRADE	4. DAFSC
5. ORGANIZATION, COMMAND, LOCATION			6. PAS CODE
7. PERIOD OF REPORT FROM: THRU:		8. NO. DAYS OF SUPERVISION	9. REASON FOR REPORT

II. JOB DESCRIPTION 1. DUTY TITLE:
2. KEY DUTIES, TASKS, AND RESPONSIBILITIES:

III. PERFORMANCE FACTORS *Specific example of performance required*	NOT OBSERVED	FAR BELOW STANDARD	BELOW STANDARD	MEETS STANDARD	ABOVE STANDARD	WELL ABOVE STANDARD
1. JOB KNOWLEDGE *(Depth, currency, breadth)*	O					
2. JUDGMENT AND DECISIONS *(Consistent, accurate, effective)*	O					
3. PLAN AND ORGANIZE WORK *(Timely, creative)*	O					
4. MANAGEMENT OF RESOURCES *(Manpower, materiel, fiscal)*	O					
5. LEADERSHIP *(Initiative, accept responsibility)*	O					
6. ADAPTABILITY TO STRESS *(Stable, flexible, dependable)*	O					
7. ORAL COMMUNICATION *(Clear, concise, confident)*	O					
8. WRITTEN COMMUNICATION *(Clear, concise, organized)*	O					
9. PROFESSIONAL QUALITIES *(Attitude, dress, cooperation, bearing)*	O					
10. HUMAN RELATIONS *(Equal opportunity participation, sensitivity)*						

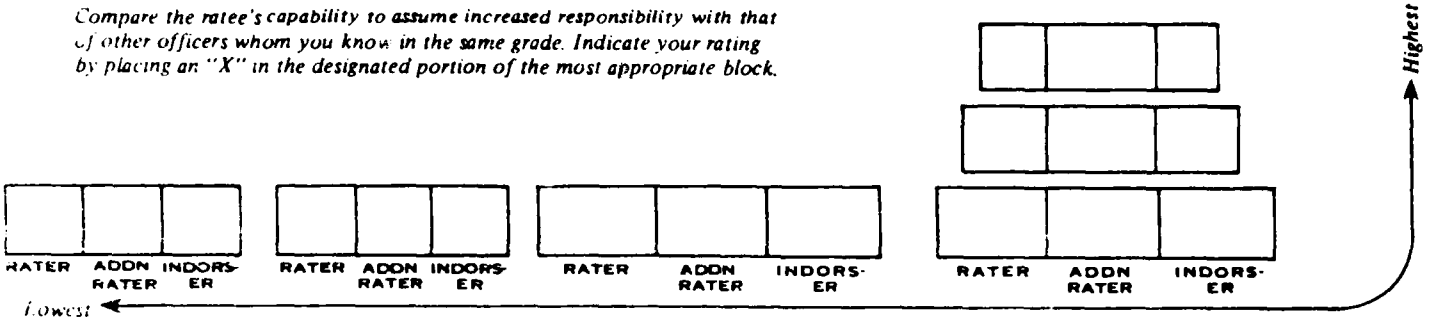
IV. ASSIGNMENT RECOMMENDATION: 1. STRONGEST QUALIFICATION:

2. SUGGESTED JOB *(Include AFSC)*:

3. ORGANIZATION LEVEL: 4. TIMING:

V. EVALUATION OF POTENTIAL:

Compare the ratee's capability to assume increased responsibility with that of other officers whom you know in the same grade. Indicate your rating by placing an "X" in the designated portion of the most appropriate block.



VI. RATER COMMENTS

NAME, GRADE, BR OF SVC, ORGN, COMD, LOCATION	DUTY TITLE	DATE
	SSAN	SIGNATURE

VII. ADDITIONAL RATER COMMENTS ☐CONCUR ☐NONCONCUR

NAME, GRADE, BR OF SVC, ORGN, COMD, LOCATION	DUTY TITLE	DATE
	SSAN	SIGNATURE

VIII. INDORSER COMMENTS ☐CONCUR ☐NONCONCUR

NAME, GRADE, BR OF SVC, ORGN, COMD, LOCATION	DUTY TITLE	DATE
	SSAN	SIGNATURE

AF FORM 707, AUG 84 (REVERSE)

U.S. GPO: 1986-166-142

APPENDIX B: RAW SCORE REGRESSION WEIGHTS USING ELEVEN VARIABLES

Table B-1. Criterion = POC Selection (N = 13,722)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
Det Co Rating	1	.078038	.054694	-
AFROTC GPA	2	.000533	.060785	.006090
GMC Credit	3	.113456	.066256	.005472
AFOQT-Acad Apt	4	.000935	.068394	.002138
Total Cadets Ranked	5	.002393	.070233	.001839
Cadet Rank	6	-.002111	.071725	.001493
Technical Credit	7	-.048599	.073179	.001454
Cumulative GPA	8	.000247	.073978	.000799
AFOQT-Verbal	9	-.000596	.074364	.000385
Scholastic Aptitude Test	10	.000080	.074622	.000258
AFOQT-Quantitative	11	.000240	.074661	.000040

Table B-2. Criterion = POC Performance Ratings (N = 5,249)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
Cumulative GPA	1	.002935	.056281	-
Det Co Rating	2	.108287	.075771	.019490
AFOQT-Verbal	3	.002206	.084025	.008254
AFROTC GPA	4	.001278	.088169	.004144
Technical Credit	5	-.079844	.090301	.002132
GMC Credit	6	.107586	.091191	.000891
Cadet Rank	7	-.002996	.091757	.000566
AFOQT-Quantitative	8	-.001352	.091823	.000066
AFOQT-Academic Aptitude	9	.001890	.091986	.000163
Total Cadets Ranked	10	-.002053	.092005	.000019
Scholastic Aptitude Test	11	-.000021	.092009	.000004

Table B-3. Criterion = POC Completion (N = 9,450)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
Cumulative GPA	1	.000960	.027979	-
Det Co Rating	2	.021273	.033172	.005193
AFROTC GPA	3	.000311	.034717	.001545
Technical Credit	4	-.052225	.035671	.000954
AFOQT-Quantitative	5	.000473	.038015	.002344
GMC Credit	6	.038237	.038632	.000618
Total Cadets Ranked	7	.000923	.038959	.000326
Cadet Rank	8	-.001035	.039408	.000450
AFOQT-Verbal	9	-.000697	.039578	.000169
Scholastic Aptitude Test	10	.000111	.040204	.000626
AFOQT-Academic Aptitude	11	.000279	.040239	.000036

Table B-4. Criterion = POC Distinguished Graduates (N = 7,679)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
Cumulative GPA	1	.001830	.094665	-
Det Co Rating	2	.027266	.114583	.019918
AFOQT-Acad Apt	3	.001278	.121243	.006660
AFROTC GPA	4	.000460	.123989	.002746
Technical Credit	5	-.049197	.126484	.002495
Cadet Rank	6	-.003687	.128767	.002283
Total Cadets Ranked	7	.001766	.131283	.002516
GMC Credit	8	.032589	.131679	.000396
Scholastic Aptitude Test	9	.000059	.131803	.000129
AFOQT-Quantitative	10	-.000158	.131837	.000034
AFOQT-Verbal	11	.000024	.131838	.000001

Table B-5. Criterion = Technical School Final Grades (N = 1,645)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
Scholastic Aptitude Test	1	.009395	.150981	-
Cumulative GPA	2	.020990	.174665	.023683
AFOQT-Quantitative	3	.037468	.183352	.008688
GMC Credit	4	1.693381	.189502	.006150
Technical Credit	5	1.317018	.193677	.004175
AFOQT-Verbal	6	.032735	.198819	.005142
AFOQT-Academic Aptitude	7	-.011107	.198989	.000169
Det Com Rating	8	-.082532	.199062	.000073
Total Cadets Ranked	9	.003059	.199089	.000028
AFROTC GPA	10	-.000455	.199098	.000009
Cadet Rank	11	-.001250	.199100	.000002

Table B-6. Criterion = Experimental Performance Evaluation (N = 1,082)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
Det Co Rating	1	.178019	.009939	-
Total Cadets Ranked	2	.003433	.015738	.005799
Technical Credit	3	.175923	.019319	.003581
GMC Credit	4	.252471	.021503	.002185
Cumulative GPA	5	.001219	.023265	.001762
AFOQT-Acad Aptitude	6	.006623	.023732	.000467
AFOQT-Quantitative	7	-.004404	.025320	.001588
AFOQT-Verbal	8	-.003784	.026982	.001662
Cadet Rank	9	.002991	.027195	.000214
AFROTC GPA	10	.000449	.027420	.000225
Scholastic Aptitude Test	11	.000053	.027426	.000006

Table B-7. Criterion = Experimental Ratings of Potential (N = 1,080)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
AFOQT-Acad Aptitude	1	.009702	.019033	-
Det Co Rating	2	.240282	.028735	.009702
Total Cadets Ranked	3	.005488	.037512	.008777
AFOQT-Verbal	4	-.007905	.041541	.004029
AFROTC GPA	5	.001858	.044418	.002877
GMC Credit	6	.285549	.046330	.001912
Technical Credit	7	.130792	.047273	.000943
Cadet Rank	8	.005336	.047856	.000584
Cumulative GPA	9	.000610	.048263	.000406
AFOQT-Quantitative	10	-.002293	.048718	.000455
Scholastic Aptitude Test	11	.000163	.048738	.000020

Table B-8. Criterion = Experimental Ratings of Motivation: (N = 1,080)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
Det Co Rating	1	.217535	.011170	-
Total Cadets Ranked	2	.006019	.021876	.010706
AFROTC GPA	3	.001678	.024114	.002238
GMC Credit	4	.218121	.025462	.001348
Technical Credit	5	.164983	.026498	.001035
AFOQT-Quantitative	6	-.005141	.027248	.000750
AFOQT - Acad Aptitude	7	.007726	.028276	.001028
AFOQT-Verbal	8	-.005162	.031210	.002934
Cadet Rank	9	.003100	.031499	.000289
Cumulative GPA	10	-.000118	.031512	.000013
Scholastic Aptitude Test	11	-.000056	.031518	.000006

Table B-9. Criterion = Officer Effectiveness Reports (OER) (N = 3,923)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
Technical Credit	1	-.043706	.013819	-
AFOQT-Quantitative	2	-.000255	.016559	.002739
GMC Credit	3	-.053948	.018854	.002296
Det Co Rating	4	-.029303	.021042	.002188
Cadet Rank	5	-.001371	.023537	.002495
AFROTC GPA	6	-.000160	.024362	.000825
Cumulative GPA	7	-.000118	.024745	.000382
Total Cadets Ranked	8	-.000327	.025070	.000326
AFOQT-Verbal	9	.000515	.025184	.000114
AFOQT-Academic Aptitude	10	.000725	.025915	.000731
Scholastic Aptitude Test	11	.000006	.025917	.000002

APPENDIX C: RAW SCORE REGRESSION WEIGHTS USING TEN VARIABLES

Table C-1. Criterion = POC Selection (N = 13,722)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
Det Co Rating	1	.077822	.054694	-
AFROTC GPA	2	.000527	.060785	.006090
GMC Credit	3	.112982	.066256	.005472
AFOQT-Acad Apt	4	.000301	.068394	.002138
Total Cadets Ranked	5	.002397	.070233	.001839
Cadets Ranked	6	-.002154	.071725	.001493
Technical Credit	7	-.047352	.073179	.001454
Cumulative GPA	8	.000246	.073978	.000799
AFOQT-Quantitative	9	.000537	.074293	.000315
Scholastic Aptitude Test	10	.000060	.074411	.000118

Table C-2. Criterion = POC Completion (N = 9,450)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
Cumulative GPA	1	.000961	.027979	-
Det Co Rating	2	.021143	.033172	.005193
AFROTC GPA	3	.000303	.034717	.001545
Technical Credit	4	-.050678	.035671	.000954
AFOQT-Quantitative	5	.000823	.038015	.002344
GMC Credit	6	.037754	.038632	.000618
Total Cadets Ranked	7	.000931	.038959	.000326
Cadet Rank	8	-.001086	.039408	.000450
Scholastic Aptitude Test	9	.000085	.039553	.000144
AFOQT-Acad Apt	10	-.000456	.039739	.000186

Table C-3. Criterion = POC Distinguished Graduates (N = 7,679)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
Cumulative GPA	1	.001830	.094665	-
Det Co Rating	2	.027273	.114583	.019918
AFOQT-Acad Apt	3	.001303	.121243	.006660
AFROTC GPA	4	.000460	.123989	.002746
Technical Credit	5	-.049257	.126484	.002495
Cadet Rank	6	-.003685	.128767	.002283
Total Cadets Ranked	7	.001766	.131283	.002516
GMC Credit	8	.032612	.131679	.000396
Scholastic Aptitude Test	9	.000060	.131803	.000129
AFOQT-Quantitative	10	-.000170	.131837	.000034

Table C-4. Criterion = POC Performance Ratings (N = 5,249)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
Cumulative GPA	1	.002919	.056281	-
Det Co Rating	2	.109407	.075771	.019490
AFROTC GPA	3	.001291	.081978	.006207
AFOQT-Acad Apt	4	.002859	.085122	.003144
AFOQT - Quantitative	5	-.002859	.088386	.003264
Technical Credit	6	-.083734	.089918	.001532
GMC Credit	7	.108066	.090826	.000907
Cadet Rank	8	-.002905	.091364	.000538
Total Cadets Ranked	9	-.002580	.091393	.000029
Scholastic Aptitude Test	10	.000034	.091403	.000010

Table C-5. Criterion = Technical School Final Grades (N = 1,645)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
Scholastic Aptitude Test	1	.010665	.150981	-
Cumulative GPA	2	.021435	.174665	.023683
AFOQT-Quantitative	3	.022532	.183352	.008688
GMC Credit	4	1.804603	.189502	.006150
Technical Credit	5	1.268602	.193677	.004175
AFOQT-Acad Apt	6	.023765	.195393	.001716
Det Co Rating	7	-.084679	.195493	.000101
Total Cadets Ranked	8	.003692	.195547	.000054
AFROTC GPA	9	-.000329	.195552	.000005
Cadet Rank	10	-.000051	.195552	.000000

Table C-6. Criterion = Experimental Performance Evaluation (N = 1,082)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
Det Co Rating	1	.177168	.009939	-
Total Cadets Ranked	2	.003643	.015738	.005799
Technical Credit	3	.182847	.019319	.003581
GMC Credit	4	.235847	.021503	.002185
Cumulative GPA	5	.001193	.023265	.001762
AFOQT-Acad Apt	6	.004157	.023732	.000467
AFOQT-Quantitative	7	-.003265	.025320	.001588
Cadet Rank	8	.002518	.025488	.000168
AFROTC GPA	9	.000377	.025610	.000123
Scholastic Aptitude Test	10	-.000197	.025704	.000093

Table C-7. Criterion = Experimental Ratings of Potential (N = 1,080)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
AFOQT-Acad Apt	1	.004551	.019033	-
Det Co Rating	2	.238887	.028735	.009702
Total Cadets Ranked	3	.005944	.037512	.008777
AFROTC GPA	4	.001698	.039890	.002377
Technical Credit	5	.145493	.041534	.001644
GMC Credit	6	.248176	.042832	.001298
Cadet Rank	7	.004362	.043253	.000421
Scholastic Aptitude Test	8	.000088	.043269	.000016
Cumulative GPA	9	.000112	.043279	.000010
AFOQT-Quantitative	10	.000091	.043280	.000001

Table C-8. Criterion = Experimental Ratings of Motivation: N = 1,080)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
Det Co Rating	1	.216624	.011170	-
Total Cadets Ranked	2	.006317	.021876	.010706
AFROTC GPA	3	.001573	.024114	.002238
GMC Credit	4	.193718	.025462	.001348
Technical Credit	5	.174582	.026498	.001035
AFOQT-Quantitative	6	-.003584	.027248	.000750
AFOQT - Acad Apt	7	.004363	.028276	.001028
Scholastic Aptitude Test	8	-.000396	.028618	.000342
Cadet Rank	9	.002464	.028806	.000189
Cumulative GPA	10	-.000151	.028827	.000020

Table C-9. Criterion = Officer Effectiveness Reports (OER) (N = 3,923)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
Technical Credit	1	-.045479	.013819	-
AFOQT-Quantitative	2	-.000449	.016559	.002739
GMC Credit	3	-.053195	.018854	.002296
Det Co Rating	4	-.029519	.021042	.002188
Cadet Rank	5	-.001328	.023537	.002495
AFROTC GPA	6	-.000156	.024362	.000825
Cumulative GPA	7	-.000113	.024745	.000382
Total Cadets Ranked	8	-.000340	.025070	.000326
AFOQT-Acad Apt	9	-.000333	.025171	.000101
Scholastic Aptitude Test	10	.000040	.025266	.000095

APPENDIX D: RAW SCORE REGRESSION WEIGHTS USING SIX VARIABLES

Table D-1. Criterion = POC Selection (N = 13,722)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
Det Co Rating	1	.109140	.054694	-
AFOQT-Acad Apt	2	.001132	.059883	.005189
Cumulative GPA	3	.000378	.061786	.001903
AFOQT-Verbal	4	-.000404	.061927	.000141
Scholastic Aptitude Test	5	.000057	.062046	.000119
AFOQT-Quantitative	6	.000018	.062046	.000000

Table D-2. Criterion = POC Completion (N = 9,450)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
Cumulative GPA	1	.001025	.027979	-
Det Co Rating	2	.037035	.033172	.005193
AFOQT-Quantitative	3	.000112	.034287	.001115
Scholastic Aptitude Test	4	.000078	.034426	.000139
AFOQT-Verbal	5	-.000547	.034693	.000267
AFOQT-Acad Apt	6	.000403	.034767	.000074

Table D-3. Criterion = POC Distinguished Graduates (N = 7,679)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
Cumulative GPA	1	.001974	.094665	-
Det Co Rating	2	.077414	.114583	.019918
AFOQT-Acad Apt	3	.001437	.121243	.006660
AFOQT-Quantitative	4	-.000511	.121604	.000361
Scholastic Aptitude Test	5	.000046	.121707	.000103
AFOQT-Verbal	6	.000114	.121720	.000013

Table D-4. Criterion = POC Performance Ratings (N = 5,249)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
Cumulative GPA	1	.003209	.056281	-
Det Co Rating	2	.164565	.075771	.019490
AFOQT-Verbal	3	.002541	.084025	.008254
AFOQT-Quantitative	4	-.001932	.084452	.000427
AFOQT-Acad Apt	5	.002238	.084677	.000225
Scholastic Aptitude Test	6	-.000047	.084696	.000019

Table D-5. Criterion = Technical School Final Grades (N = 1,645)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
Scholastic Aptitude Test	1	.010213	.150981	-
Cumulative GPA	2	.020678	.174665	.023683
AFOQT-Quantitative	3	.046687	.183352	.008688
AFOQT-Verbal	4	.034055	.187946	.004593
AFOQT-Acad Apt	5	-.017318	.188384	.000439
Det Co Rating	6	-.041897	.188405	.000021

Table D-6. Criterion = Experimental Ratings of Job Performance (N = 1,082)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
Det Co Rating	1	.153156	.009939	-
AFOQT-Acad Apt	2	.007013	.013975	.004036
Cumulative GPA	3	.001120	.015256	.001281
AFOQT-Verbal	4	-.003749	.016379	.001122
AFOQT-Quantitative	5	-.002784	.017385	.001007
Scholastic Aptitude Test	6	.000158	.017442	.000057

Table D-7. Criterion = Experimental Ratings of Potential (N = 1,080)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
AFOQT-Acad Apt	1	.010252	.019033	-
Det Co Rating	2	.208277	.028735	.009702
AFOQT-Verbal	3	-.007626	.033416	.004681
Scholastic Aptitude Test	4	.000734	.034303	.000886
AFOQT-Quantitative	5	-.000875	.034373	.000070
Cumulative GPA	6	.000295	.034447	.000074

Table D-8. Criterion = Experimental Ratings of Motivation (N = 1,080)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
Det Co Rating	1	.206295	.011170	-
AFOQT-Acad Apt	2	.008162	.012955	.001785
AFOQT-Verbal	3	-.005072	.014872	.001917
AFOQT-Quantitative	4	.003421	.016240	.001368
Scholastic Aptitude Test	5	.000103	.016262	.000022
Cumulative GPA	6	.000049	.016265	.000002

Table D-9. Criterion = Officer Effectiveness Reports (N = 3,923)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
AFOQT-Quantitative	1	-.000670	.011506	-
Det Co Rating	2	-.018064	.014277	.002771
Cumulative GPA	3	-.000103	.014588	.000311
AFOQT-Acad Apt	4	-.000670	.014759	.000171
AFOQT-Verbal	5	-.000579	.015506	.000747
Scholastic Aptitude Test	6	-.000038	.015590	.000084

APPENDIX E: RAW SCORE REGRESSION WEIGHTS USING THREE VARIABLES

Table E-1. Criterion = POC Selection (N = 13,722)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
Det Co Rating	1	.109538	.054694	-
AFOQT-Acad Apt	2	.001115	.059883	.005189
Cumulative GPA	3	.000391	.061786	.001903

Table E-2. Criterion = POC Completion (N = 9,450)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
Cumulative GPA	1	.001046	.027979	-
Det Co Rating	2	.037509	.033172	.005193
AFOQT-Acad Apt	3	.000447	.033979	.000807

Table E-3. Criterion = POC Distinguished Graduates (N = 7,679)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
Cumulative GPA	1	.001976	.094665	-
Det Co Rating	2	.077225	.114583	.019918
AFOQT-Acad Apt	3	.001361	.121243	.006660

Table E-4. Criterion = POC Performance Ratings (N = 5,249)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
Cumulative GPA	1	.003140	.056281	-
Det Co Rating	2	.162414	.075771	.019490
AFOQT-Acad Apt	3	.002643	.080697	.004927

Table E-5. Criterion = Technical School Final Grades (N = 1,645)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
AFOQT-Acad Apt	1	.097282	.135448	-
Cumulative GPA	2	.021561	.161189	.025741
Det Co Rating	3	-.080696	.161267	.000078

Table E-6. Criterion = Experimental Ratings of Performance (N = 1,082)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
Det Co Rating	1	.155986	.009939	-
AFOQT-Acad Apt	2	.002917	.013975	.004036
Cumulative GPA	3	.001042	.015256	.001281

Table E-7. Criterion = Experimental Ratings of Potential (N = 1,082)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
AFOQT-Acad Apt	1	.007484	.019033	-
Det Co Rating	2	.214491	.028735	.009702
Cumulative GPA	3	.000304	.028814	.000079

Table E-8. Criterion = Experimental Ratings of Motivation (N = 1,080)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
Det Co Rating	1	.210039	.01170	-
AFOQT-Acad Apt	2	.002376	.012955	.001785
Cumulative GPA	3	-.000066	.012960	.000004

Table E-9. Criterion = Officer Effectiveness Reports (N = 3,923)

Variable	Entering Sequence	Regression Weight	Multiple R^2	Change in R^2
AFOQT-Acad Apt	1	-.000935	.008846	-
Det Co Rating	2	-.019034	.011648	.002801
Cumulative GPA	3	-.000111	.011986	.000339

APPENDIX F: F-TEST OF DIFFERENCE IN R^2 BETWEEN FULL AND RESTRICTED MODELS FOR NINE CRITERIA

Appendix F: F-Test of Differences Between R^2 for Nine AFROTC Criteria

Table F-1. Criterion = Selection/Nonselection into POC

Models	R^2 diff	df	F-Value	Sig. Lvl.
Full vs. 1	.000250	1, 13,711	3.7043	ns
Full vs. 2	.012615	5, 13,711	37.3833	.01
Full vs. 3	.012875	8, 13,711	23.8462	.01
1 vs. 2	.012365	4, 13,712	45.1937	.01
1 vs. 3	.012625	7, 13,712	26.3680	ns
2 vs. 3	.000260	3, 13,716	1.2723	ns

Table F-2. Criterion = AFROTC Student Performance Evaluation

Full vs. 1	.000606	1, 5,238	3.4958	ns
Full vs. 2	.007313	5, 5,238	8.4373	.01
Full vs. 3	.011312	8, 5,238	8.1569	.01
1 vs. 2	.006707	4, 5,239	10.1914	.01
1 vs. 2	.010706	7, 5,239	8.8187	.01
2 vs. 3	.003999	3, 5,243	7.6355	.01

Table F-3. Criterion = Completion/Noncompletion of POC

Full vs. 1	.000500	1, 9,439	4.9174	.05
Full vs. 2	.005472	5, 9,439	10.7632	.01
Full vs. 3	.006260	8, 9,439	7.6957	.01
1 vs. 2	.004972	4, 9,440	12.2198	.01
1 vs. 3	.005760	7, 9,440	8.0895	.01
2 vs. 3	.000788	3, 9,440	2.5699	ns

Table F-4. Criterion = Distinguished Graduate/Nondistinguished Graduate

Full vs. 1	.000001	1, 7,668	.0088	ns
Full vs. 2	.010118	5, 7,668	17.8714	.01
Full vs. 3	.010595	8, 7,668	11.6974	.01
1 vs. 2	.010117	4, 7,669	89.3763	.01
1 vs. 3	.010594	7, 7,669	13.3695	.01
2 vs. 3	.000477	3, 7,673	1.3891	ns

Table F-5. Criterion = Technical School Final Course Grade

Models	R^2 diff	df	F-Value	Sig. Lvl.
Full vs. 1	.003548	1, 1,634	7.2386	.01
Full vs. 2	.010695	5, 1,634	4.3640	.01
Full vs. 3	.037833	8, 1,634	9.6483	.01
1 vs. 2	.007147	4, 1,635	14.5266	.01
1 vs. 3	.034285	7, 1,635	9.9546	.01
2 vs. 3	.027138	3, 1,639	18.2681	.01

Table F-6. Criterion = Experimental Performance Evaluation

Full vs. 1	.001722	1, 1,071	1.8963	ns
Full vs. 2	.009984	5, 1,071	2.1989	.05
Full vs. 3	.012170	8, 1,071	1.6752	ns
1 vs. 2	.008262	4, 1,072	2.2726	ns
1 vs. 3	.010448	7, 1,072	1.6422	ns
2 vs. 3	.002186	3, 1,076	.7980	ns

Table F-7. Criterion = Experimental Potential Evaluation

Full vs. 1	.005458	1, 1,069	6.1335	.05
Full vs. 2	.014291	5, 1,069	3.2120	.01
Full vs. 3	.019924	8, 1,069	2.7988	.01
1 vs. 2	.008833	4, 1,070	2.4697	.05
1 vs. 3	.014466	7, 1,070	2.3113	.05
2 vs. 3	.005633	3, 1,074	2.0886	ns

Table F-8. Criterion = Experimental Motivation Evaluation

Full vs. 1	.002691	1, 1,069	2.9703	ns
Full vs. 2	.015253	5, 1,069	3.3672	.01
Full vs. 3	.018558	8, 1,069	2.5605	.01
1 vs. 2	.012562	4, 1,070	3.4159	.01
1 vs. 3	.015867	7, 1,070	2.4655	.05
2 vs. 3	.003305	3, 1,074	1.1100	ns

Table F-9. Criterion = Officer Effectiveness Report

Full vs. 1	.000651	1, 3,912	2.6145	ns
Full vs. 2	.010327	5, 3,912	8.2948	.01
Full vs. 3	.013931	8, 3,912	6.9935	.01
1 vs. 2	.009676	4, 3,913	9.7110	.01
1 vs. 3	.013280	7, 3,913	7.6160	.01
2 vs. 3	.003604	3, 3,917	4.7801	.01

APPENDIX G: INTERCORRELATIONS BETWEEN 11 QIS VARIABLES

Table G-1. Intercorrelations Between QIS Variables

	1 - AA	2 - Q	3 - V	4 SAT	5 GPA	6 - DR	7 R-GPA	8 GMC	9 TC	10 TR	11 CR
1. AFOQT - AA[a]	1.0000										
2. AFOQT - Q [b]	.8203	1.0000									
3. AFOQT - Verbal	.8338	.5299	1.0000								
4. SAT[c]	.8516	.7563	.7393	1.0000							
5. GPA[d]	.2501	.2315	.2135	.2958	1.0000						
6. Det. Rat[e]	.1433	.1344	.1113	.1685	.3199	1.0000					
7. AFROTC GPA	.2507	.2298	.2221	.2832	.3440	.3362	1.0000				
8. GMC[f]	.1527	.1430	.1297	.1523	.0464	.0436	.0465	1.0000			
9. TC[g]	.4052	.5001	.2467	.4486	.1505	.1090	.1950	.1254	1.0000		
10. Tot Ranked	.0375	.0352	.0276	-.0146	-.0548	-.0304	-.0496	.0348	.0152	1.0000	
11. Cadet Rank	-.1205	-.1135	-.0853	-.1644	-.3336	-.7565	-.3351	-.0189	-.1032	.3467	1.0000

[a]AA = Academic Aptitude composite score
[b]Q = Quantitative composite score
[c]Scholastic Achievement Test combined Verbal and Quantitative scores
[d]Cumulative college grade point average
[e]Detachment Commander's Rating
[f]General Military Credit (previous military experience or courses)
[g]Technical Credit (enrolled in technical degree area or has completed calculus courses required for a technical degree)

APPENDIX H: RAW SCORE AND STANDARD REGRESSION WEIGHTS FOR MODELS 1, 2, AND 3 FOR NINE CRITERIA

Table H-1. **Raw Score Regression Weights of Model 1 Variables for the Prediction of POC, Training, and Job Performance Criteria**

Predictor Variables	CRITERIA								
	POCsel	POCdq	POCper	POCcom	TECHgr	EXPper	EXPpot	EXPmot	OERs
DetCo rat	.0778*	.0273*	.1094*	.0211*	-.0847	.1772*	.2389*	.2166	-.0295
GMilCred	.1130*	.0326	.1081	.0378	1.8046	.2358	.2482	.1937	-.0532*
Tot Cadets	.0024	.0018	-.0026	.0009	.0037	.0036*	.0059*	.0063*	-.0003
Cadet rank	-.0022	-.0037	-.0029	-.0011	-.0001	.0025	.0044	.0025	-.0013
AFROTC GPA	.0005*	.0005	.0013*	.0003*	-.0003	.0004	.0017	.0016*	-.0002
Cum GPA	.0002	.0018*	.0029*	.0010*	.0214*	.0012	.0001	-.0002	-.0001
SAT	.0001	.0001	.0000	.0001	.0107*	-.0002	.0001	-.0004	.0000
AFOQT-AA	.0003	.0013*	.0048	-.0005	.0238	.0042	.0046*	.0044	-.0003
AFOQT-Q	.0005	-.0002	-.0029	.0008	.0225*	-.0033	.0001	-.0036	-.0004*
TechCred	-.0474	-.0493	-.0837	-.0507	1.2686	.1828*	.1455	.1746	-.0455*
Multiple R	.2728	.3631	.3023	.1993	.4422	.1603	.2080	.1698	.1590
R2	.0744	.1318	.0914	.0397	.1956	.0257	.0433	.0288	.0253

*indicates that variable was one of the first three entered in stepwise regression.

Table H-2. **Raw Score Regression Weights of Model 2 Variables for the Prediction of POC, Training, and Performance Criteria**

Predictor Variables	CRITERIA								
	POCsel	POCdq	POCper	POCcom	TECHgr	EXPper	EXPpot	EXPmot	OERs
DetCo rat	.1091*	.0774*	.1646*	.0370*	-.0419	.1532*	.2083*	.2063*	-.0181*
Cum GPA	.0038*	.0020*	.0032*	.0010*	.0207*	.0011*	.0003	.0000	-.0001*
SAT	.0001	.0000	-.0005	.0001	.0102*	.0002	.0007	.0001	-.0000
AFOQT-AA	.0011*	.0014*	.0022	.0004	-.0173	.0070*	.0103*	.0082*	-.0007
AFOQT-Q	.0000	-.0005	-.0019	.0001*	.0467*	-.0028	-.0009	-.0034	-.0007*
AFOQT-V	-.0004	.0001	.0025*	-.0005	.0341	-.0037	-.0076*	-.0051*	.0006
Multiple R	.2491	.3488	.2910	.1865	.4341	.1321	.1856	.1275	.1249
R2	.0620	.1217	.0847	.0348	.1884	.0174	.0344	.0163	.0156

*indicates that variable was one of the first three entered in stepwise regression.

Table H-3. **Raw Score Regression Weights of Model 3 Variables for the Prediction of POC, Training, and Performance Criteria**

Predictor Variables	CRITERIA								
	POCsel	POCdq	POCper	POCcom	TECHgr	EXPper	EXPpot	EXPmot	OERs
DetCo rat	.1095*	.0772	.1624	.0375	-.0807	.1560*	.2145	.2100*	-.0190
Cum GPA	.0003	.0020*	.0031*	.0010*	.0216	.0010	.0003	-.0001	-.0001
AFOQT-AA	.0011	.0014	.0020	.0004	.0973*	.0029	.0075*	.0024	-.0009*
Multiple R	.2486	.3482	.2841	.1843	.4016	.1235	.1697	.1138	.1095
R2	.0618	.1212	.0807	.0340	.1612	.0153	.0288	.0129	.0120

*indicates that the variable was the first one entered in stepwise regression.

Table H-4. **Standard Regression Weights of Model 1 Variables for the Prediction of POC, Training, and Job Performance Criteria**

Predictor Variables	CRITERIA								
	POCsel	POCdq	POCper	POCcom	TECHgr	EXPper	EXPpot	EXPmot	OERs
DetCo rat	.1490*	.0504*	.0954*	.0418*	-.0093	.0936*	.1075*	.1049*	-.0751
GMilCred	.0686*	.0198	.0307	.0247	.0751	.0423	.0378	.0317	-.0459*
Tot Cadets	.0659	.0581	-.0054	.0310	.0074	.0546*	.0758*	.0866*	-.0217
Cadet rank	-.0642	-.1162	-.0413	-.0361	-.0001	.0241	.0355	.0216	-.0593
AFROTC GPA	.0630*	.0573	.0755*	.0406*	-.0024	.0141	.0538	.0536*	-.0271
Cum GPA	.0297	.2361*	.1779*	.1312*	.1613*	.0435	.0035	-.0051	-.0198
SAT	.0218	.0230	.0063	.0349	.2177*	-.0210	.0080	-.0386	.0206
AFOQT-AA	.0170	.0803*	.1308	-.0296	.0860	.0819	.0764*	.0787	-.0305
AFOQT-Q	.0301	-.0105	-.0780	.0537	.0793*	-.0647	.0015	-.0650	-.0417*
TechCred	-.0511	-.0603	-.0484	-.0649	.0753	.0632*	.0429	.0553	.0767*
Multiple R	.2728	.3631	.3023	.1993	.4422	.1603	.2080	.1698	.1590
R2	.0744	.1318	.0914	.0397	.1956	.0257	.0433	.0288	.0253

*indicates that variable was one of the first three entered in stepwise regression.

Table H-5. **Standard Regression Weights of Model 2 Variables for the Prediction of POC, Training, and Performance Criteria**

Predictor Variables	CRITERIA								
	POCsel	POCdq	POCper	POCcom	TECHgr	EXPper	EXPpot	EXPmot	OERs
DetCo rat	.2090*	.1432*	.1435*	.0732*	-.0046	.0809*	.0937*	.0999*	-.0460*
Cum GPA	.0456*	.2546*	.1955*	.1401*	.1556*	.0408*	.0092	.0017	-.0181*
SAT	.0210	.0178	-.0087	.0321	.2085*	.0168	.0665	.0100	-.0197
AFOQT-AA	.0639*	.0886*	.0610	.0262	-.0626	.1382*	.1720*	.1473*	-.0614
AFOQT-Q	.0010	-.0316	-.0527	.0073*	.1644*	-.0552	-.0148	-.0621	-.0618*
AFOQT-V	-.0230	.0071	.0725*	-.0361	.1345	-.0700	-.1213*	.0868*	.0517
Multiple R	.2491	.3488	.2910	.1865	.4341	.1321	.1856	.1275	.1249
R2	.0620	.1217	.0847	.0348	.1884	.0174	.0344	.0163	.0156

*indicates that variable was one of the first three entered in stepwise regression.

Table H-6. **Standard Regression Weights of Model 3 Variables for the Prediction of POC, Training, and Performance Criteria**

Predictor Variables	CRITERIA								
	POCsel	POCdq	POCper	POCcom	TECHgr	EXPper	EXPpot	EXPmot	OERs
DetCo rat	.2098*	.1428	.1416	.0741	-.0089	.0824*	.0965	.1017*	-.0484
Cum GPA	.0472	.2549*	.1913*	.1428*	.1622	.0380	.0095	-.0022	-.0194
AFOQT-AA	.0629	.0839	.0720	.0291	.3518*	.0575	.1256*	.0429	-.0856*
Multiple R	.2486	.3482	.2841	.1843	.4016	.1235	.1697	.1138	.1095
R2	.0618	.1212	.0807	.0340	.1612	.0153	.0288	.0129	.0120

*indicates that the variable was the first one entered in stepwise regression.

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